High-Performance Fire Detector for Spacecraft, Phase I

Completed Technology Project (2005 - 2005)

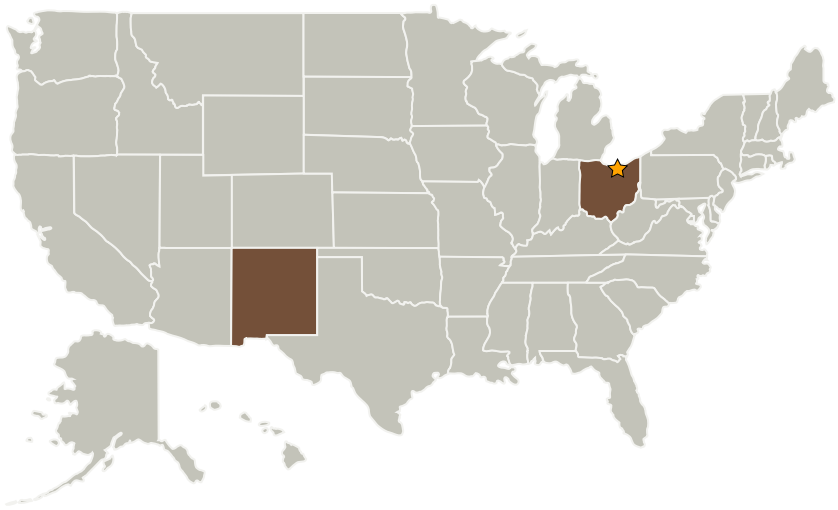
Project Introduction

The danger from fire aboard spacecraft is immediate with only moments for detection and suppression. Spacecraft are unique high-value systems where the cost of failure is measured in lives and dollars. Space crews have little or no chance to escape vessels on fire. It is imperative to detect the onset of combustion in microgravity at the earliest possible moment. Present fire detectors onboard spacecraft are inadequate due to sensitivity, time response, or both. Smoke detectors are insufficient for detecting the early stages of combustion, sensors are needed to detect the products of combustion directly. These sensors must meet stringent size, weight and power requirements. Vista Photonics proposes to develop rugged, compact fire detection instrumentation capable of selectively and simultaneously measuring the combustion species HCN, acetylene, carbon dioxide and carbon monoxide at parts-per-million (ppm) or better sensitivities in a 1 Hz bandwidth. The enabling technology for meeting NASA's stringent mission requirements is a new rugged, compact, and lightweight optical path length enhancement cell that recovers the theoretical sensitivity of proven high-performance optical absorption detection techniques.

Anticipated Benefits

Potential NASA Commercial Applications: The technology will find application in trace gas monitoring in chemical process streams. Human breath-based diagnostics of specific pathologies. Environmental monitoring and regulatory compliance in industrial settings.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Vista Photonics, Inc.	Supporting Organization	Industry	Santa Fe, New Mexico

Primary U.S. Work Locations	
New Mexico	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jeffrey Pilgrim

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.2 Fire: Detection, Suppression, and Recovery